UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/733,940	12/12/2000	Motoo Nishihara	Q62264	5144

7590 03/29/2005

SUGHRUE, MION, ZINN, MACPEAK & SEAS, PLLC
2100 PENNSYLVANIA AVENUE, N.W.
WASHINGTON, DC 20037-3213

EXAMINER	
NG, CHRISTINE Y	

ART UNIT	PAPER NUMBER
2663	

DATE MAILED: 03/29/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/733,940	NISHIHARA, MOTOO	
	Examiner	Art Unit	
	Christine Ng	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 December 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-132* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25,37-65,77-105 and 117-132* is/are rejected.

7)☒ Claim(s) *26-36,66-76 and 106-116* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *12 December 2000* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *12/12/00,6/21/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 101

1. 35 U.S.C. 101 reads as follows:

> Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

Claim 1 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The frame construction method is not claimed as embodied in a computer-readable media or apparatus, which does not permit the frame construction method to be realized.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 9, 49 and 125 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 9 and 49 recites the limitation "the PN pattern" in line 2. There is insufficient antecedent basis for this limitation in the claim.

Claim 125 recites the limitation "the CRC16" in line 4. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 1-5 and 41-45 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent No. 5,936,965 to Doshi et al.

Referring to claims 1 and 41, Doshi et al disclose in Figure 1 a frame construction device of network equipment comprising a layer 1 frame construction means (ABM layer 130) for constructing a layer 1 frame which is capable of accommodating data of any protocol that is selected from an STM signal, ATM cells, a primary IP packet and a best effort IP packet (none) in a common frame format (Figure 2A-2B). The ABM layer 130 creates fixed sized ABM PDUs from the various HL-PDU bytestreams 112-1 to 112-n, which each can be of a different higher layer protocol type (ATM, STM or IP). Each ABM PDU has a common frame format (Figure 2A) and a common header (Frame 2B). Refer to Column 1, lines 25-30; Column 4, lines 46-54; Column 5, lines 17-30; and Column 6, line 2 to Column 7, line 5.

Referring to claims 2 and 42, Doshi et al disclose in Figures 2A-2B that the layer 1 frame includes:

A layer 1 frame header (Figure 2A, fields 210, 214,216) for containing header information of predetermined types. Refer to Column 6, line 2 to Column 7, line 5.

A layer 1 frame payload (Figure 2A, payload 220) for containing the data such as the STM signal, the ATM cells, and the IP packet. Refer to Column 6, lines 22-24.

Referring to claims 3 and 43, Doshi et al disclose in Figure 4 that the layer 1 frame further includes a payload CRC field (Figure 4, CRC 450) for containing the result

of a CRC operation conducted for the layer 1 frame payload. Refer to Column 5, lines 52-59 and Column 11, lines 12-14.

Referring to claims 4 and 44, Doshi et al disclose in Figure 8 that the layer 1 frame payload (820-i to 820-l) is a variable-length field. Refer to Column 13, line 27 to Column 14, line 48.

Referring to claims 5 and 45, Doshi et al disclose that the length of the variable-length field is set between 0 Kbyte and 64 Kbytes. ATM cells have a payload of 53 bytes (Column 8, line 63 to Column 9, line 30), STM cells have a payload of 53 bytes (Column 7, lines 19-24), and IP packets are of variable length (Column 9, line 47 to Column 10, line 30).

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 6-12, 20, 23, 40, 46-52, 60, 63 and 80 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,414,967 to Van Grinsven et al.

Referring to claims 6 and 46, Doshi et al disclose in Figures 2A-2B that the layer 1 frame header includes:

A "protocol" identifier (Figure 2B, type field 232) indicating the type of the data which is transferred in the layer 1 frame. Refer to Column 6, lines 57-59 and lines 64-67.

A "Header CRC" identifier (Figure 2B, CRC field 236 and parity bit 238) indicating the result of a CRC operation conducted for the layer 1 frame header except itself. Refer to Column 6, line 62 to Column 7, line 5.

Doshi et al do not disclose a "packet length" identifier indicating the length of the layer 1 frame payload and a "frame mode" indicator indicating the type of the layer 1 frame.

However, Doshi et al disclose in Figure 9 that variable length HL-PDUs carry length indicators in the headers and a frame mode field (B/C/E 840). The length indicator indicates the length of the payload and the B/C/E field 840 indicates whether the payload of an ABM PDU is the beginning, continuation, or end segment of a higher layer PDU. Refer to Column 13, line 55 to Column 14, line 48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a "packet length" identifier indicating the length of the layer 1 frame payload and a "frame mode" indicator indicating the type of the layer 1 frame, the motivation being so that the receiver will know the beginning and end of a packet.

Doshi et al also do not specifically disclose a "stuff" identifier indicating whether or not stuff data is contained in the layer 1 frame.

However, Doshi et al disclose in Figure 9 that variable length HL-PDUs may require padding 860 to fill the unused space in a PDU if the packet cannot occupy the

entire PDU. Refer to Column 13, line 55 to Column 14, line 48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a "stuff" identifier indicating whether or not stuff data is contained in the layer 1 frame, the motivation being so that in case the packet does not occupy the entire payload of the PDU and padding is required, the receiver will be able to know by an identifier in the header that the packet used padding.

Doshi et al also do not disclose a "priority" identifier indicating the priority of the data which is transferred in the layer 1 frame.

Van Grinsven et al disclose in Figure 2 that a header CTRL0 and CTRL1 contain a 1-bit priority bit P, where indicates high priority when set to 1 and low priority when set to 0. Refer to Column 4, lines 9-21. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a "priority" identifier indicating the priority of the data which is transferred in the layer 1 frame, the motivation being so that the receiver will accept the packets of higher priority before packets of lower priority.

Referring to claims 7 and 47, Doshi et al disclose in Figures 2A-2B that the "protocol identifier" (Figure 2B, type field 232) indicates whether the type of the data transferred in the layer 1 frame is IPv4 data (none), IPv6 data (none), STM data, ATM data or dummy data (none). Refer to Column 6, lines 57-59 and lines 64-67.

Referring to claims 8 and 48, Doshi et al do not disclose an OAM frame as a special-purpose layer 1 frame for monitoring a path between the ingress point and the egress point is constructed and transferred periodically.

Van Grinsven et al disclose in Figure 2 an OAM frame (CRTL2 byte) that is used of the carriage of OAM information. Refer to Column 4, lines 42-44. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include an OAM frame as a special-purpose layer 1 frame for monitoring a path between the ingress point and the egress point is constructed and transferred periodically, the motivation being so that the transmitter and receiver can determine whether or not the system in operational and monitor congestion by sending OAM cells back and forth.

Referring to claims 9 and 49, Doshi et al do not disclose a PN pattern packed in the payload of the OAM frame.

Van Grinsven et al disclose in Figure 2 an OAM frame (CRTL2 byte) that is used of the carriage of OAM information. OAM cells have a certain frame structure to indicates its source, destination, function type, etc. Refer to Column 4, lines 42-44. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a PN pattern packed in the payload of the OAM frame, the motivation being so that the transmitter and receiver can determine whether or not the system in operational and monitor congestion by sending OAM cells back and forth.

Referring to claims 10 and 50, refer to the rejection of claims 7 and 47.

Referring to claims 11 and 51, Doshi et al disclose in Figure 3C that the header (315) is provided to the layer 1 frame header so as to be used by line terminating devices for establishing byte synchronization and/or frame synchronization. A variable-

length PDU 316 contains a header 315 that is used for synchronization information so that the boundaries between variable-length frames are reconstructed at the receiver.

Doshi et al do not disclose that the "header CRC" identifier is used for the synchronization.

However, the header CRC (Figure 2B, CRC field 236 and parity bit 238) is part of the header and contributes to the synchronization process. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the "header CRC" identifier is used for the synchronization, the motivation being that the header CRC corrects errors in the header to facilitate synchronization.

Referring to claims 12 and 52, Doshi et al disclose in Figures 2A-2B that the layer 1 frame header is a fixed-length field. The length of the ABM common header 210 will be fixed depending on the number of HL protocols supported and the desired level of common header error protection. Refer to Column 6, lines 29-32.

Referring to claims 20, 23, 40, 60, 63 and 80, Doshi et al disclose in Figures 2A-2B that where the ATM cell/IP packet are packed in the layer 1 frame payload, information indicating ATM/IP is described in the "protocol" identifier (Figure 2B, type field 232). Refer to Column 6, lines 57-59 and lines 64-67.

Doshi et al do not disclose information indicating the type of the ATM cells/IP packets is described in the "priority" identifier.

Van Grinsven et al disclose in Figure 2 that a header CTRL0 and CTRL1 contain a 1-bit priority bit P, where indicates high priority when set to 1 and low priority when set to 0. Refer to Column 4, lines 9-21. Therefore, it would have been obvious to one of

ordinary skill in the art at the time the invention was made to include information indicating the type of the ATM cells/IP packets is described in the "priority" identifier, the motivation being that ATM cells or IP packets may have different priority levels depending on what data they are carrying.

8. Claims 13 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,414,967 to Van Grinsven et al, and in further view of U.S. Patent No. 6,343,341 to Cabrera et al.

Doshi et al and Van Grinsven et al do not disclose that where the stuff data is contained in the layer 1 frame, the layer 1 frame construction means adds a "stuffing length" identifier indicating the length of the stuff data to the layer 1 frame header.

Cabrera et al disclose in Figure 2B a data segment with a data segment header 206 comprises a pad length field. The pad length field provides the length of padding included at the end of the data segment if the data in the segment is shorter than the fixed-length data segment. Refer to Column 1, line 60 to Column 2, line 2; Column 5, line 66 to Column 6, line 12; and Column 6, lines 27-42. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that where the stuff data is contained in the layer 1 frame, the layer 1 frame construction means adds a "stuffing length" identifier indicating the length of the stuff data to the layer 1 frame header, the motivation being so that the receiver will know the length of padding in a certain data segment, thereby facilitating data reception.

9. Claims 14-17, 19, 21, 22, 54-57, 59, 61, 62, 81-85, 94-97, 99, 101, 102, 121-123, 126 and 128-131 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S.

Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al.

Referring to claims 14, 54 and 94, Doshi et al do not disclose a layer 2 frame for containing and transferring the data such as the STM signal, the ATM cells, the primary IP packet, the best effort IP packet, etc. is packed by the layer 1 frame construction means in the layer 1 frame payload.

Bernstein et al discloses in Figure 2 that a datagram layer frame 200 which contains datagram data 212 is packed into a physical frame payload 206 of a physical frame 202. Refer to Column 1, lines 41-46. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include a layer 2 frame for containing and transferring the data such as the STM signal, the ATM cells, the IP packet, etc. is packed by the layer 1 frame construction means in the layer 1 frame payload, the motivation being that in order to transfer data across a network to a destination point, the data must be encapsulated into a physical frame where the destination address is mapped to a physical address for transmission across the physical layer. Refer to Column 1, lines 33-40.

Referring to claims 15, 55 and 95, Doshi et al do not disclose that the layer 2 frame includes: a layer 2 frame header for containing information to be used for the routing of the layer 2 frame; and a layer 2 frame payload in which the data such as the STM signal, the ATM cells, the IP packet, etc is packed.

Bernstein et al discloses in Figure 2 that the datagram layer frame includes: a datagram frame header (210) for containing information (Figure 4; IP source/destination

addresses 402,404) to be used for the routing of the datagram frame; and a datagram payload (212) in which the datagram data is packet. Refer to Column 1, lines 58-61. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the layer 2 frame includes: a layer 2 frame header for containing information to be used for the routing of the layer 2 frame; and a layer 2 frame payload in which the data such as the STM signal, the ATM cells, the IP packet, etc is packed, the motivation being so that after encapsulation into the physical frame, the routing addresses can be mapped into its corresponding physical addresses for physical transmission across the network. Refer to Column 1, lines 33-40.

Referring to claims 16, 56 and 96, Doshi et al disclose that where the STM signal is packet in the layer 2 frame payload, an N channel STM signal of a bit rate of N X 64 Kbytes which is transferred from an STM device is packed in the layer 2 frame payload. Refer to Column 7, lines 28-32. Refer also to the rejection of claims 14, 54, and 94 and claims 15, 55 and 95.

Referring to claims 17, 57 and 97, Doshi et al disclose that where ATM cells are packed in the layer 2 frame payload, ATM cells which are transferred from an ATM device are packed in the layer 2 frame payload. Refer to Column 5, lines 17-27. Refer also to the rejection of claims 14, 54, and 94 and claims 15, 55 and 95.

Referring to claims 19, 21, 59, 61, 99 and 101, Doshi et al do not disclose that where the STM/ATM signals is packed in the layer 2 frame payload, the layer 2 frame header includes a route label as information which is used for the routing of the layer 1 frame containing the STM/ATM signal through relaying nodes.

Bernstein et al discloses in Figure 2 that the datagram layer frame includes: a datagram frame header (210) for containing a route label (Figure 4; IP source/ destination addresses 402,404) as information to be used for the routing of the datagram frame. The routing IP addresses are mapped into its corresponding physical addresses for physical transmission across the network and are also used to determine the next hop in the path towards the packet's destination. Refer to Column 1, lines 33-40 and lines 58-61 and Column 1, line 66 to Column 2, line 26. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that where the STM/ATM signals is packed in the layer 2 frame payload, the layer 2 frame header includes a route label as information which is used for the routing of the layer 1 frame containing the STM/ATM signal through relaying nodes, the motivation being so that the routing addresses can be used to determine the next hop for a packet to hop across the network to its destination.

Referring to claims 22, 62 and 102, Doshi et al disclose that where the IP packet is packed in the layer 2 frame payload, the IP packet is packet in the layer 2 frame payload without being partitioned. This occurs if the IP packet is the shorter or equal to the length of the fixed-length payload. Refer to Column 13, lines 44-52. Refer also to the rejection of claims 14, 54, and 94 and claims 15, 55 and 95.

Referring to claim 81, Doshi et al disclose in Figure 1 a data transfer system including edge nodes and core nodes, wherein:

The edge node (transmitter 105/receiver 108) is connected to an STM device (any of bytestreams 112-1 to 112-n), an ATM device (any of bytestreams 112-1 to 112-

n) and an IP router (any of bytestreams 112-1 to 112-n). Refer to Column 5, lines 12-27. The edge node comprises:

A layer 1 frame construction means (ABM layer 130 at transmitter 105) for constructing a layer 1 frame which is capable of accommodating data of any protocol that is selected from an STM signal supplied from the STM device, ATM cells supplied from the ATM device, a primary IP packet supplied from the IP router, and a best effort IP packet supplied from the IP router (none) in common frame format. Refer to the rejection of claims 1 and 41.

A layer 1 frame transmission means (transmitter 105) for transmitting the layer 1 frames containing the STM signals, the layer 1 frames containing the ATM cells and the layer 1 frames containing the IP packets which are constructed by the layer 1 frame construction means to a core node (another transmitter 105/receiver 108). Refer to the rejection of claims 1 and 41.

A layer 1 frame separation means (ABM layer 130 at receiver 108) for separating layer 1 frames supplied from the core node into STM layer 1 frames containing STM signals, ATM layer 1 frames containing ATM cells, and IP layer 1 frames containing IP packets. Refer to Column 6, lines 10-11.

A data extraction means (SAR/PACK layer 120 at receiver 108) for extracting the STM signals, the ATM cells, and the IP packets from the STM layer 1 frames, the ATM layer 1 frames and the IP layer 1 frames, respectively. Refer to Column 5, lines 56-59 and Column 6, lines 11-13.

A data transmission means (HPPL 110 at receiver 108) for transmitting the STM signals extracted by the data extraction means to the STM device, transmitting the ATM cells extracted by the data extraction means to the ATM device, and transmitting the IP packets extracted by the data extraction means to the IP router. Refer to Column 6, lines 13-18.

The core node is connected to one or more edge nodes and/or one or more core nodes and transfers the layer 1 frame supplied from an edge node or core node to an appropriate core node or edge node. Edge nodes and core nodes are made up of transmitters 105/receivers 108 and transfer packets to one another.

Doshi et al do not disclose that the transfer of layer 1 frames is done by referring to routing information contained in the layer 1 frame.

Bernstein et al et al disclose in Figure 2 that the physical frame contains a header (Figure 3) with routing information including a destination address (Figure 3, 302) and a source address (Figure 3, 204). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the transfer of layer 1 frames is done by referring to routing information contained in the layer 1 frame, the motivation being so that routers at the physical level will be able to determine along which path to transmit the packets based on the source and destination routing information.

Referring to claim 82, refer to the rejection of claims 2 and 42.

Referring to claim 83, refer to the rejection of claims 3 and 43.

Referring to claim 84, refer to the rejection of claims 4 and 44.

Referring to claim 85, refer to the rejection of claims 5 and 45.

Referring to claim 121 and 122, Doshi et al disclose in Figure 3A that each STM frame is 125 microseconds and that the layer 1 frame transmission means of the edge nodes transmits the layer 1 frame containing the STM signals to the core node at 125 microsecond time intervals. "A respective channel in each frame is separated by 125 microseconds". Refer to Column 7, lines 24-40.

Referring to claim 123, Doshi et al disclose that the layer 1 frame transmission means (Figure 1, ABM layer 130) of the edge node frame multiplexes (Figures 3A-3C) the layer 1 frames containing the STM signals, the layer 1 frame containing the ATM cells, and the layer 1 frames containing the IP packets, giving high priority in order of STM, ATM, IP, and transmits the frame-multiplexed layer 1 frames to the core node. As shown in Figure 3A, the order of a 125 microsecond frame is STM ABM-PDU, then ATM ABM-PDU, and then VL ABM-PDU. Refer to Column 6, lines 2-5; Column 7, line 58; and Column 9, lines 5-9 and lines 15-18.

Referring to claim 126, refer to the rejection of claims 11 and 51.

Referring to claim 128, Doshi et al and Bernstein et al disclose that the core node extracts the layer 2 frames from received layer 1 frames,

Determines the next core node or edge node to which the data contained in the layer 2 frame payload should be transferred, be referring to the layer 2 frame header of each layer 2 frame. Refer the rejection of claims 81 and claims 15, 55 and 95.

Constructs the layer 1 frames containing the data with regard to each next node. Refer to the rejection of claim 81.

Frame multiplexes the layer 1 frames with regard to each next node. Refer to the rejection of claim 123.

Transmits the frame-multiplexed layer 1 frames to the next core node or edge node. Refer to the rejection of claim 123.

Referring to claim 129, refer to the rejection of claim 121.

Referring to claim 130, refer to the rejection of claim 122.

Referring to claim 131, refer to the rejection of claim 123.

10. Claims 18 and 58 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,414,967 to Van Grinsven et al, and in further view of U.S. Patent No. 5,627,824 to Arnold.

Doshi et al disclose in Figures 2A-2B that where the STM signal is packed in the layer 1 frame payload, information indicating STM is described in the "protocol" identifier (Figure 2B, type field 232). Refer to Column 6, lines 57-59 and lines 64-67.

Doshi et al do not disclose information indicating CBR traffic is described in the "priority" identifier.

Van Grinsven et al disclose in Figure 2 that a header CTRL0 and CTRL1 contain a 1-bit priority bit P, where indicates high priority when set to 1 and low priority when set to 0. Refer to Column 4, lines 9-21. Furthermore, Arnold discloses that STM channels may be carried using CPR. Refer to Column 6, line 4. CBR provides a constant guaranteed rate of transfer while allocating enough bandwidth to each channel to support a maximum rate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include information indicating CBR

traffic is described in the "priority" identifier, the motivation being that an STM flow using CBR may have different priority levels depending on what data they are carrying.

11. Claims 24, 37, 64, 77, 104 and 117 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al, and in further view of U.S. Patent No. 6,271,946 to Chang et al.

Doshi et al do not disclose that where the IP packet is packed in the layer 2 frame payload, the layer 2 frame header includes a route label as information which is used for the routing of the layer 1 frame containing the IP packet through relaying nodes. Refer to the rejection of claims 19, 21, 59, 61, 99 and 101.

Doshi et al and Bernstein et al also do not disclose that the layer 2 frame header includes a flow label as information which is used for designating a wavelength to be used for transferring the layer 1 frame containing the IP packet between relaying nodes.

Chang et al disclose in Figure 1 that IP packets are transported over selected wavelength channels, since wavelength are assigned for a particular IP session. Optical headers are also placed in front of a packet to provide information on the assigned wavelength. Refer to Column 7, lines 46-66; Column 8, lines 44-47; and Column 11, lines 64-67. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include disclose that the layer 2 frame header includes a flow label as information which is used for designating a wavelength to be used for transferring the layer 1 frame containing the IP packet between relaying

nodes, the motivation being so that routers will be able to determine from a packet's header the wavelength over which to transmit the packet.

12. Claims 25, 38, 65, 78, 105 and 118 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al in view of U.S. Patent No. 6,271,946 to Chang et al, and in further view of U.S. Patent No. 6,643,287 to Callon et al.

Doshi et al, Bernstein et al et al and Chang et al do not disclose that the flow label is generated by conducting the Hash operation to the header of the IP packet.

Callon et al disclose that a hash operation can be performed on a first portion of a header to create another source/destination address pair in order to select another path within another network to transmit the packet. Refer to Column 4, lines 57-64; Column 5, lines 12-40; and Column 8, lines 20-48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include disclose that that the flow label is generated by conducting the Hash operation to the header of the IP packet, the motivation being that the hash operation is a cryptographic transformation that has a variety of computational uses that is collision free.

13. Claims 39, 79 and 119 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al, and in further view of U.S. Patent No. 5,974,458 to Abe et al.

Doshi et al and Bernstein et al do not disclose that the layer 2 frame header is omitted when the layer 1 frame is transmitted as a COM frame or an EOM frame.

Abe et al disclose in Figure 1 that a frame header is omitted when the frame is a COM or EOM frame. Refer to Column 1, lines 38-54. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include the layer 2 frame header is omitted when the layer 1 frame is transmitted as a COM frame or an EOM frame, the motivation being to save bandwidth and processing time by eliminating duplicating header information, since the segments of the same messages have the same header information.

14. Claims 86-92, 100, 103, 120, 127 and 132 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al, and in further view of U.S. Patent No. 6,414,967 to Van Grinsven et al.

Referring to claim 86, refer to the rejection of claims 6 and 46.

Referring to claim 87, refer to the rejection of claims 7 and 47.

Referring to claim 88, refer to the rejection of claims 8 and 48.

Referring to claim 89, refer to the rejection of claims 9 and 49.

Referring to claim 90, refer to the rejection of claims 10 and 50.

Referring to claim 91, refer to the rejection of claims 11 and 51.

Referring to claim 92, refer to the rejection of claims 12 and 52.

Referring to claims 100, 103 and 120, refer to the rejection of claims 20, 23, 40, 60, 63 and 80.

Referring to claim 127, Doshi et al disclose that the layer 1 frame separation means of the edge node judges whether the data contained in the layer 1 frame is the

STM signal, the ATM cells, or the IP packets by referring to the "protocol" identifier (Figure 2B, type field 232) of the layer 1 frame header. Refer to Column 6, lines 57-59 and lines 64-67.

Doshi et al do not specifically disclose that the layer 1 frame separation means demultiplexes frame-multiplexed layer 1 frames into layer 1 frames by use of the "packet length" identifier of the layer 1 frame header.

However, Doshi et al disclose that ATM and STM packets are 53 bytes in length and that IP packets (Figure 8) can be separated into B/C/E segments. Refer to Column 13, line 27 to Column 14, line 48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the layer 1 frame separation means demultiplexes frame-multiplexed layer 1 frames into layer 1 frames by use of the "packet length" identifier of the layer 1 frame header, the motivation being so that the receiver will know when it is receiving an ATM/STM packet or if the data packet was separated into B/C/E segments, the receiver will know the total packet length in order to determine when it is receiving a new packet.

Referring to claim 132, Doshi et al and Vans Grinsven et al do not specifically disclose that the OAM frame is used by the edge node at the egress point for path monitoring.

However, OAM cells are transferred back and forth between transmitter and receiver. Therefore, it would have been obvious to one of ordinary skill in the art at the tie the invention was made to include that the OAM frame is used by the edge node at

the egress point for path monitoring, the motivation being so that the egress point can initiate a path monitoring OAM cell to the receiver.

15. Claim 93 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al, in view of U.S. Patent No. 6,414,967 to Van Grinsven et al, and in further view of U.S. Patent No. 6,343,341 to Cabrera et al. Refer to the rejection of claims 13 and 53.

16. Claim 98 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al, and in further view of U.S. Patent No. 5,627,824 to Arnold. Refer to the rejection of claims 18 and 58.

17. Claims 124 and 125 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,936,965 to Doshi et al in view of U.S. Patent No. 6,157,644 to Bernstein et al and in further view of U.S. Patent No. 5,909,427 to Manning et al.

Doshi et al disclose that the layer 1 frame construction means of the edge node conducts the CRC operation to the layer 1 frame payload and adds the CRC result to the layer 1 frame as the payload CRC field (Figure 4, CRC 450). Refer to Column 5, lines 52-59 and Column 11, lines 12-14.

Doshi et al do not disclose that the CRC operation is a 16-bit CRC operation or a 32-bit CRC operation. Manning et al disclose that CRC-16 and CRC-32 are standard CRC checks used in IEEE 802 LAN standards. Refer to Column 6, lines 46-48. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include that the CRC operation is a 16-bit CRC operation or a

32-bit CRC operation, the motivation being that CRC is a method for checking for errors in data transmitted over a communication link by applying a 16-bit or a 32-bit polynomial at the transmitter and then reapplying the same 16-bit or 32-bit polynomial at the receiver to compare the results. A 16-bit CRC is used for smaller transmissions and a 32-bit CRC in used for larger transmissions.

Allowable Subject Matter

18. Claims 26-36, 66-76 and 106-116 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

19. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christine Ng whose telephone number is (571) 272-3124. The examiner can normally be reached on M-F; 8:00 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

C. Ng
March 23, 2005

RICKY NGO
PRIMARY EXAMINER

3/28/05